

Fig 1.

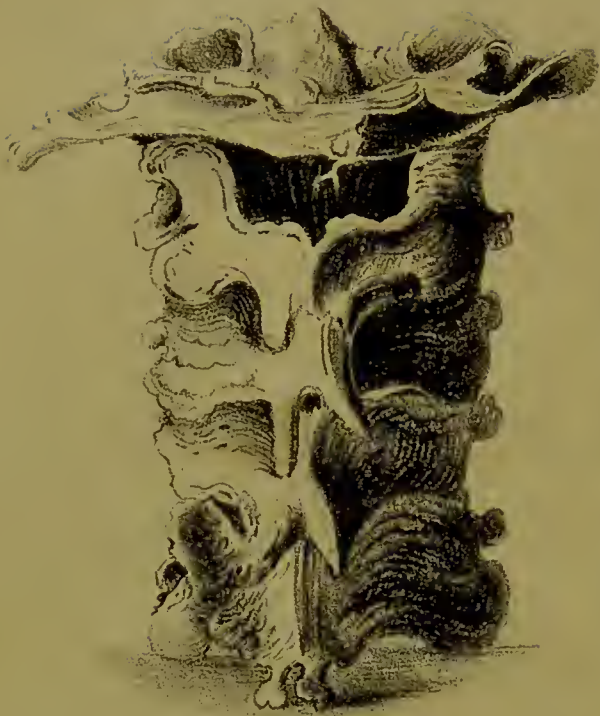


Fig. 2.



Fig 3.

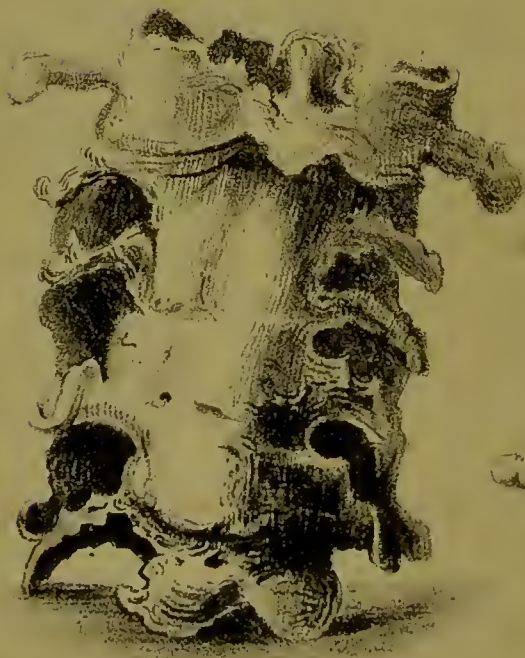
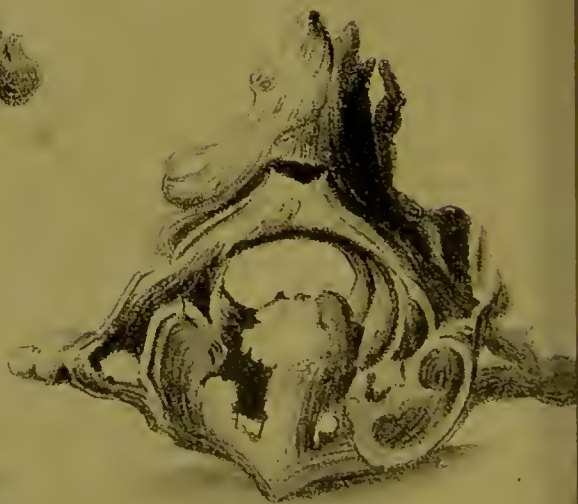


Fig. 4.



C A S E
OF
PERFECT ANCHYLOSIS
OF THE
FIVE SUPERIOR CERVICAL VERTEBRÆ
TO EACH OTHER,
AND COMPLETE DISLOCATION BACKWARDS
OF THE 5TH FROM THE 6TH, WITHOUT FRACTURE.

(WITH FOUR ENGRAVINGS.)

BY STEPHEN S. STANLEY,

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Surgeon of the Royal Hospital, Haslar.

G O S P O R T :

PRINTED BY J. HAMMOND, JUN., 38, HIGH STREET.

R35496

TO SIR WILLIAM BURNETT, K_T. K.C.H.

FELLOW OF THE ROYAL SOCIETY,

HER MAJESTY'S PHYSICIAN GENERAL OF THE NAVY,

&c. &c. &c. &c.

SIR,

The following interesting case and post mortem, which, from the position your kindness has placed me in here, has enabled me fully to carry out, I have taken the liberty of dedicating to you. And I have only to hope, that my humble efforts for the advancement of the profession may keep pace with your own

strenuous exertions—which have been so long,
and so successfully, devoted to the improvement
of the naval medical service ; and

I have the honour to be,

Sir,

Your most obedient humble servant,

STEPHEN S. STANLEY.

*Royal Naval Hospital, Haslar,
September 20th, 1838.*

HISTORY OF THE CASE

Sent with the Patient ; with the subsequent symptoms, and treatment pursued by Dr. Mortimer, the Senior Surgeon, under whose care he was placed.

GEORGE WELDON, æt 37, seaman, lost his footing yesterday evening, the 20th of July, 1838, about 9 o'clock, and fell backwards, on his head, on the deck. Found him immediately afterwards complaining of a severe pain in the back part of his neck, and between the shoulders, and of pain and numbness in the arms. His face was pale, and his pulse weak. Five grs. of Carb. Ammonia in an ounce of Camphor mixture was administered—after which he rallied. He is worse this morning, complaining now of numbness, not only in the arms, but also in the legs ; of the pain in the back part of the neck being more severe, and of inability to turn or move in any direction. As the ship is in

Dock, it is thought advisable to send him for the benefit of Hospital Treatment.

Signed, James M. DEAS,

Assistant Surgeon.

H.M.S. Pique.

July 21st. 1838.

Admitted into the Haslar Royal Naval Hospital, on the 21st. of July, 1838. at 11 A.M. in a state of perfect consciousness, no wound, no external appearance of bruise. Both Arms are commencingly paralytic, the left the most so—the accident occurred yesterday Evening, since which he has not passed Urine, nor have the Bowels been opened, the pulse is slow, weak and oppressed. Pupils unaffected, nor does he refer to any complaint, save about the Muscles of the Neck and Shoulders.

His breathing is undisturbed, Catheter introduced, Haustus Senna Statim, Enema. Evening : a free evacuation from the Bowels, Pulse up and sharp, Enema repr. *v.s.* ad. xx ounces. 22nd July ; Respiration is hurried, the pulse is weak, there are continual attempts to expectorate a frothy mucus, but the attempt is ineffectual—is most anxious to

inhale air, he desires to be raised higher—higher still—this is accomplished with facility, by the rude yet excellent apparatus of Borthwick, repr. Enema—Catheterismus, Hyd. Submur grs. vj, Pulv, Jalap ² ~~a~~ ^{Scruple}, Syr, q. s. ft. Bolus Statim.—Noon:—He is easier, he breaths more uninterruptedly, but the pulse flags.—Evening: Respiration laborious, Death is approaching.—Died at $\frac{1}{2}$ past 4 o'Clock, on the morning of the 23rd., exactly fifty-five hours and a half, after the accident, and forty-one hours and a half, after his admission into this Hospital.

POST MORTEM.—On the posterior surface of the body, extending from the occiput to as far as the 6th or 7th Dorsal Vertebra, there was considerable ecchymosis; and in making a section of the integuments, and sub-cutaneous cellular tissue, a quantity of blood was found effused into its texture. In prosecuting the dissection further, especially in a space reaching from the 1st cervical to the 2nd Dorsal Vertebra, coagulated blood in great quantity was found surrounding the muscular fibres, a number of which were ruptured and softened: these being sponged away, a little more

careful dissection exposed to view a considerable displacement, *backwards*, of the 5th from the 6th Cervical Vertebrae. All the blood was sponged and cleared away, and as much of the soft parts removed as was possible, for the purpose of ascertaining the exact position of the dislocated Vertebrae,—It was then found that the little finger could easily be passed, underneath it, into the spinal canal; that the body of the 5th pressed severely on the spinal cord, and rested on the Laminæ and spinous process of the 6th cervical Vertebra. The spinal column was now removed (sawing through the angles of the ribs) at the 7th Dorsal Vertebra. It was then ascertained, beyond all doubt, that the injury was a complete Dislocation, *without Fracture*. The ligaments and intervertebral substance were all ruptured; and, when suspended from above, the parts were held together by the Vertebral arteries and Spinal marrow, with its Theca alone:—the Theca Vertebralis being uninjured.

HEAD:—The Cranium thick, and very heavy; the thinnest part measuring $2\frac{1}{2}$ lines, and the thickest $5\frac{1}{2}$ lines. The great longitudinal Sinus was gorged with blood, and so large as to

admit with ease the forefinger. The Medullary substance of the brain was soft and very vascular : when the section of the Centrum Magnum Ovale was made, it was found studded with spots of red blood ; nothing else was observed until an attempt was made to remove it : it was then found impossible to pass a knife through the Foramen magnum, to make a section of the medulla oblongata. The brain was, however, removed ; and it was then ascertained that the Foramen magnum was so much contracted, as scarcely to admit the point of the little finger. On closer inspection, and after dissecting off the Dura Mater in this situation, the constriction was evidently produced by the odontoid process of the axis being much larger than natural, and projecting, in a conspicuous manner, upwards towards the base of the brain, and backwards on the Medulla oblongata, which, from the little that was attached to the pons varolii appeared small, and nearly flat. By applying the saw at the posterior margin of the Foramen magnum, and carrying it obliquely forwards and upwards, a section of the base of the cranium was now made for the purpose of ascertaining the exact condition of the odontoid process, and the

beautifully arranged ligaments in this situation. The section being completed, and a little dissection made, it was ascertained, that the whole of the Cervical Vertebrae, from the Atlas down to the seat of dislocation, were completely Anchylosed. Not the least vestige of Ligamentous structure could be observed, with the exception of the Capsular, and Occipito Atlantal Ligaments, forming the articulation between the occiput and atlas; and of these, the Capsular ligaments and Synovial membranes, when cut into, were found to be so much thickened and altered in structure, as more to resemble cartilage than ligament, and calculated to impede seriously, if not altogether, the nodding actions of the Head, and slight lateral motion, which this articulation permits. No trace could be found whatever of the apparatus ligamentosus, and lateral ligaments, connecting the occiput with the atlas; neither was there anything remaining in the form of the ligaments, which complete the articulation between the atlas and axis: but nature, ever bountiful, had formed a beautiful provision for the absence of the transverse ligament, by an isthmus of bone, extending from the anterior aspect of the odontoid

process to the posterior concave surface of the anterior arch of the atlas :—thus, in most respects, answering every purpose for which the transverse ligament is known, although placed in a situation diametrically opposite.

After the usual process of maceration, the bones appeared white, and exceedingly compact in their tissue, and, with the exception of their ankylosed condition, are perfectly normal—their form in every respect not appearing to differ from the general characters by which these vertebræ are known.

The most remarkable feature in the whole preparation—and evidently the result of a former dislocation forwards—is the position of the atlas; which, on the right side especially, is pushed forwards and upwards from off the articulating surface of the axis, so as to cause the odontoid process to present itself nearly in the centre of the circle of the atlas. A bridge of bone exactly half-an-inch in length, and varying from three to four lines in breadth, passes nearly horizontally forwards, from the odontoid process to the atlas, as described above, and connects

them together. The axis is also pushed forwards in the same manner from the 3rd cervical vertebra, but not to so great an extent, giving the entire preparation a twisted appearance to the left side:—Its length measuring ^{anteriorly} from the superior margin of the ring of the atlas to the inferior margin of the body of the 5th cervical vertebra, is $3\frac{1}{2}$ inches. The diameter of the spinal foramen of the atlas, from behind forwards, is exactly one inch and four lines, and the transverse diameter one inch and half a line. The odontoid process, instead of terminating at its apex in a point as it generally does, presents a broad and irregular ovoid form, measuring, transversely, half an inch—and from behind forwards, including the bony bridge alluded to, one inch: its length is three-fourths of an inch, and its distance from the posterior arch of the ring of the atlas only four lines.

REMARKS.—It may be supposed, that having ascertained the exact nature of this accident, the author of this paper was very anxious to obtain every particular relating to this man's history; and as the *Pique* was still riding at Spithead, he

took the earliest opportunity of going on board, for the express purpose of gaining all the information possible ; and he has to thank Mr DEAS, the Assistant Surgeon, for his kindness in furthering his views on that occasion.

It appears that the man had, for some years past, always been subject to a stiff neck, that he very often complained of rheumatic pains in that region, and of sore throat. He was, nevertheless, a very efficient and active seaman, always doing his duty, and never on the sick list ; but was unable to move his head to one side, and was compelled to turn his whole body round when he was desirous of looking either to the right or to the left. It further appears that, at the time the accident occurred, the deceased, although not drunk, was in the state that sailors call "rather fresh," and was "larking" with some of his mesmates, and in attempting to catch one of them, his foot slipped, and he fell backwards, his head only SLIGHTLY striking the deck.

Complete dislocation of the vertebræ, without fracture, (if the 1st and 2nd cervical be excepted,) are so very rare, that the occurrence

of such an accident is doubted, and even positively denied, by some of our best surgeons:—it is very desirable therefore that well authenticated cases should be published. Sir ASTLEY COOPER, in his work on dislocations, appears to doubt the possibility of a complete dislocation, without fracture, though he does not deny that such an accident may occur. DELPECH, BOYER, and some others, assert that it is utterly impossible—and the latter gentleman gives some very sound anatomical facts, in regard to the construction of the articulations, for his reason in disbelieving it. There are, however, several undoubted cases on record; and Mr. LAWRENCE, Surgeon of Bartholemew's Hospital, has published a case—if the author's memory is correct—in the *Medico-Chirurgical Transactions*, that ought to convince the most sceptical. Sir CHARLES BELL has also published, in his work “on injuries of the Spine and Thigh Bone,” a case of complete dislocation of the last dorsal from the first lumbar vertebra, (in a child that was knocked down by a stage-coach,) with entire division of the spinal cord. This patient survived, and was taken from the hospital, and died thirteen months afterwards

from croup: there was, however, a small portion of the bone broken off. Professor RUST has also recorded a case of dislocation in the cervical region, which was replaced by himself. The injury occurred in consequence of a severe fall on the head. The neck was completely bent to one side, the upper extremities paralysed, and attacks of convulsions and hiccough supervened.

Replacement was attempted, and succeeded. The patient was made to sit on the ground, and the head drawn straight upwards by an able assistant,—and the cure was completed by the local application of cold.

EHRLICH has recorded a most remarkable case of dislocation of the atlas. A young man, 16 years of age, fell in carrying a sack of flour upstairs, and his head was forcibly bent forwards by the burthen. He was found senseless; with livid countenance, prominent eyes, tongue hanging out of the mouth, with slow and interrupted respiration, and pulse scarcely perceptible. The limbs were motionless, and apparently paralysed; urine and fœces passing involuntarily; the head was inclined to the right side, and had lost its

firmness, so that it fell by its own weight from side to side, when unsupported. The articular process of the second vertebra projected on the left side. Ehrlich considered it a dislocation with pressure on the spinal cord—and caused extension of the head to be made, while he endeavoured to force back the atlas, and bring the second vertebra forwards.

After some effort, the replacement was effected with a snap:—the head now became steady, and the arms moved; but the patient remained insensible, with dilated pupils: the respiration and pulse were improved—and, on the next day, consciousness returned. A good deal of swelling of the neck and ecchymosis came on, but soon subsided, and after ten or twelve days he quite recovered.

In all the accounts however which the author has read, he notices,—that the direction of the displacement, when resulting from accident, has been forwards and upwards, and not, as in this case, *backwards and downwards*.

That the Anchylosis of the cervical vertebræ, above the seat of the injury, may not have had

some influence in producing this anomaly, is left to the more matured judgment of the elder members of the profession : though the writer is certainly disposed to think, that the direction of the dislocation, and the accident also, may be accounted for, in a great measure, by their abnormal condition. It appears very doubtful, that the slight fall which this man got, could, under ordinary circumstances, have produced such extensive and fatal injury.

With regard to the ankylosis, in this instance ;—there are a number of cases on record, very similar, though not to so great an extent. WYNPERSE and BOYER have both met with cases of dislocation of the occiput upon the atlas, and of the latter upon the second vertebra, with ankylosis. DAUBENTON mentions a very remarkable case of this kind, where the second vertebra of the neck was pushed so far back as to leave only an interval of three lines between the odontoid process and the posterior arch of the atlas ; the second vertebra, at the same time, inclining towards the right. It certainly appears surprising that serious and fatal symptoms should not supervene, when we consider that

the spinal marrow must inevitably be compressed in a very great degree; and it is a matter of astonishment, how a patient could possibly live sufficiently long for ankylosis to be completed.

In this case, related by DAUBENTON, the distance between the odontoid process and the posterior arch of the atlas is one line less than in the case related above. Professor SANDIFORT, of Leyden, has described a case where there was displacement of the atlas and axis, with ankylosis of these two bones to each other, and to the occiput: he describes also several others, chiefly of ankylosis, between the occiput and atlas.

There is one remarkable case recorded by him, where the occiput, all the cervical, and the two superior dorsal vertebræ were ankylosed: but the articulating processes and laminæ only were implicated; the bodies of the vertebra being still connected by their fibro-cartilage.

We have also in the museum, at Haslar, a specimen of entire ankylosis of the second and third cervical vertebræ to each other; but there does not appear to have been any displacement.

There is another preparation, shewing the

commencement of anchylosis in the dorsal region, at the articulating processes.

It would appear, therefore, that a more extensive case of complete anchylosis, than the one now under consideration, has not yet been authenticated and published. There can be no doubt that the primary disease has been ulceration of the cartilages, spontaneous dislocation of the first and second cervical vertebræ following. Professor Rust, of Vienna, has given the best, if not the only account, of this disease :—first, in the *Saltzburg Medico-Chirurgical Journal*, in 1813, and afterwards, more elaborately, in his work on *Diseases of the Joints*, published in 1817. The first symptoms of this disease, according to him, are, pain in the neck becoming more severe at night, or in swallowing a large mouthful, or drawing a deep breath. The pain affects one side of the neck, especially when the head is moved towards the shoulder; it extends from the larynx towards the nape, and often to the scapula of the pained side.

No external alteration is perceptible; but firm pressure on the region of the first and second vertebræ produces considerable pain, and thus

points out the seat of the disease. The difficulty of swallowing, and breathing; and hoarseness, increase, alternating with pain in the neck, which seems to fix about the back of the head, and becomes intolerable on moving that part. The head sinks towards one shoulder, the face being turned a little down: for, in general, the articulations are affected on one side only, and that was the left, in seven out of nine examinations, after death. If both sides are affected, the head will incline directly forwards. In this state things continue for several weeks or months; and, before worse symptoms come on, there is often apparent improvement, freer motion, and more natural situation of the head. But the uneasiness in speaking and swallowing returns; the pain becomes more severe and extensive; the head falls a little backwards, and sinks towards the opposite side. The patient feels as if the head were too heavy, and he carefully supports it with his hands, when he moves from the sitting to the lying position, or *vice versa*. This may be considered a patho-gnomonic symptom of the affection. Another symptom, which, at this period, shews the true nature of the disease, is a peculiar expression of pain in the countenance;

which, combined with the position and stiffness of the head, constitutes so characteristic an assemblage of appearances, that it is enough to have seen it once, in order to recognise it again immediately. In the further progress of the case, noise in the head, deafness, giddiness, cramps, and convulsions, partial paralysis, particularly of the upper limbs—loss of voice, purulent expectorations, and hectic symptoms supervene. Generally, no external change is observable, either in the neck, or in the nape ;—and Rust observed, in one case only, swelling of the affected side, which broke, and left fistulous ulcers,

But the slightest pressure in the region of the three upper vertebræ is acutely painful ; and, sometimes, in the advanced period of the disease, a grating of rough surfaces is distinctly perceived, when the head is turned. The patient may continue for months in this helpless and painful state—and then dies, either from exhaustion or debility—or, which is more frequent, suddenly and unexpectedly. Experience has furnished very little satisfactory knowledge in regard to the treatment of this disease.

Blisters, setons, and issues, have been tried ; but Rust found these remedies only capable of retarding the progress of the disease, and producing little or no abatement of the symptoms. The only cure is that effected by nature ; and the best treatment appears to be that, where such a position, and quietude of the patient is adopted, which favors its terminating in ankylosis.

It appears rather strange that the ankylosis should have terminated so abruptly in this case, there was no appearance whatever of a disposition to change in the articulation between the 5th and 6th Vertebra, the seat of dislocation ; the ligaments in this situation (although ruptured) were distinctly capable of being made out, and those immediately succeeding are perfectly normal, with the exception of the Ligamenta Subflava, in the Dorsal region, where there are evident symptoms of ossific change.

FINIS.

DESCRIPTION OF PLATES.

FIG. 1—Represents a posterior view of the preparation; shewing the displacement of the Atlas, and position of the odontoid process, and anchylosis of the oblique processes.

FIG. 2—Lateral view, shewing the displacement of the Atlas, and Anchylosis of the articulating processes and bodies.

FIG. 3—Anterior view, shewing the entire Anchylosis of the bodies, and the twisted appearance given the preparation in consequence of previous spontaneous dislocation.

FIG. 4—View of the preparation placed on its anterior surface, shewing the displacement of the Atlas, the position of the odontoid process, the bridge of bone extending from it to the Atlas, and the narrow space for the transmission of the Medulla Spinalis.

